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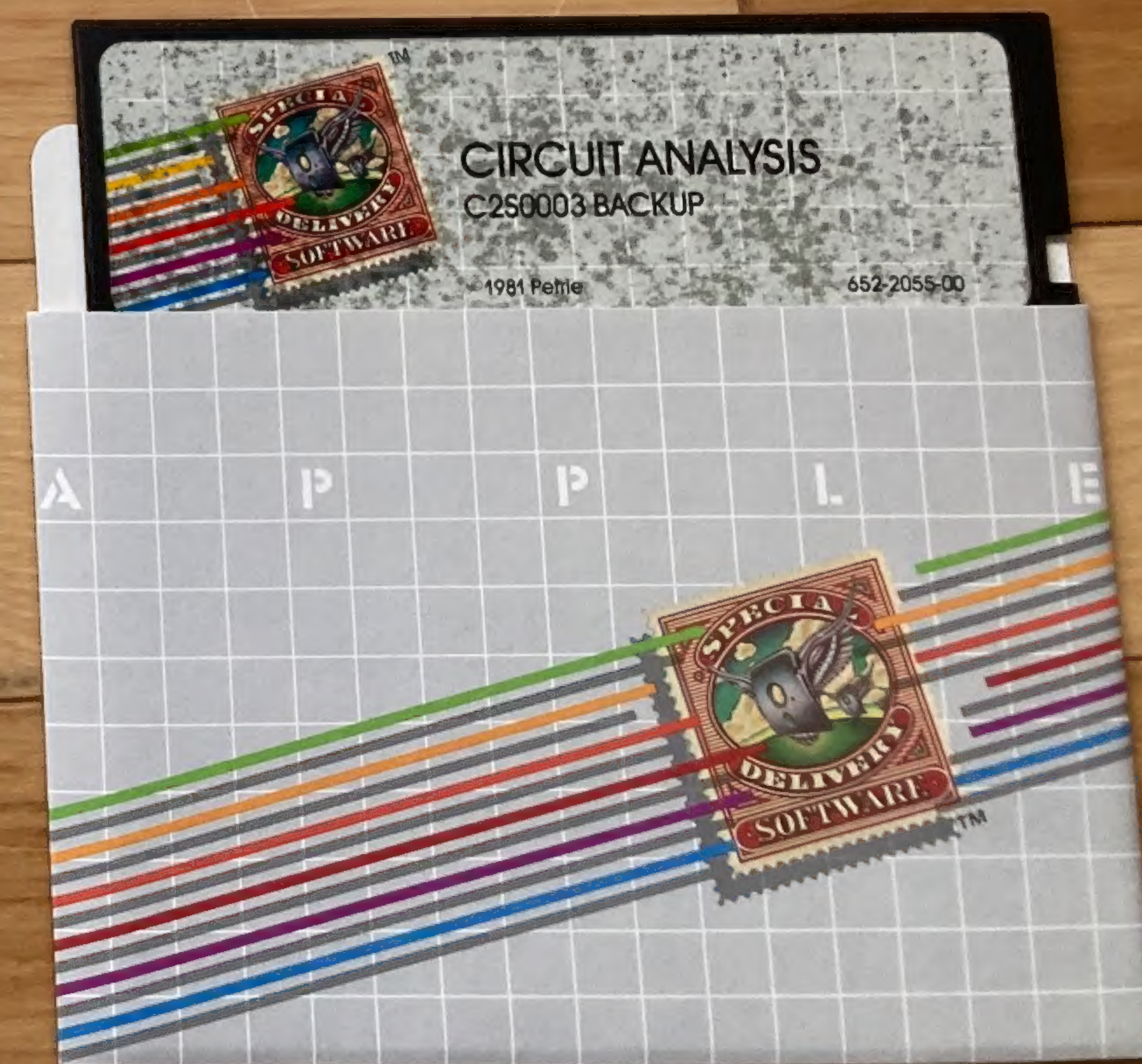
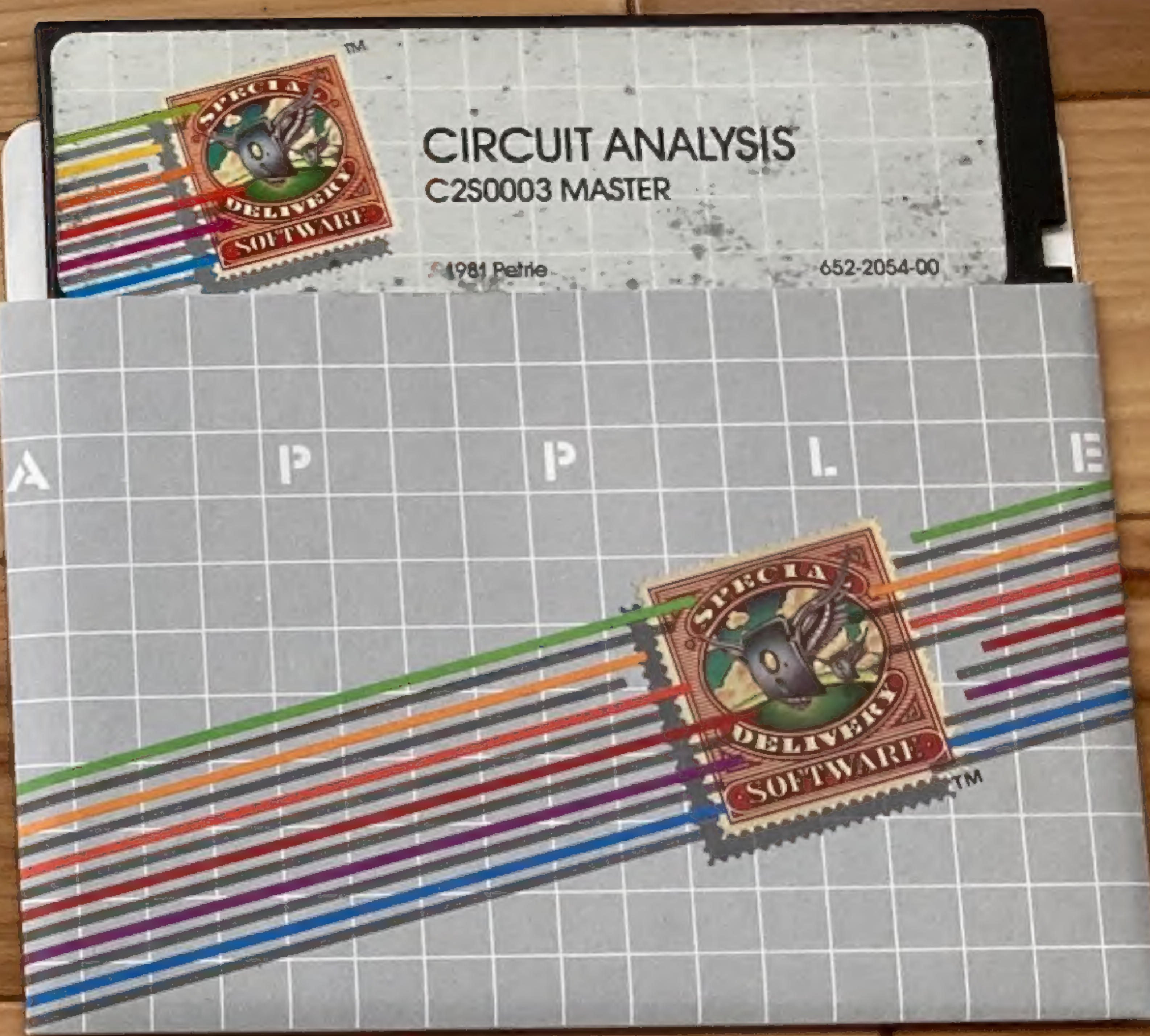
# CIRCUIT ANALYSIS

Written by A. F. Petrie

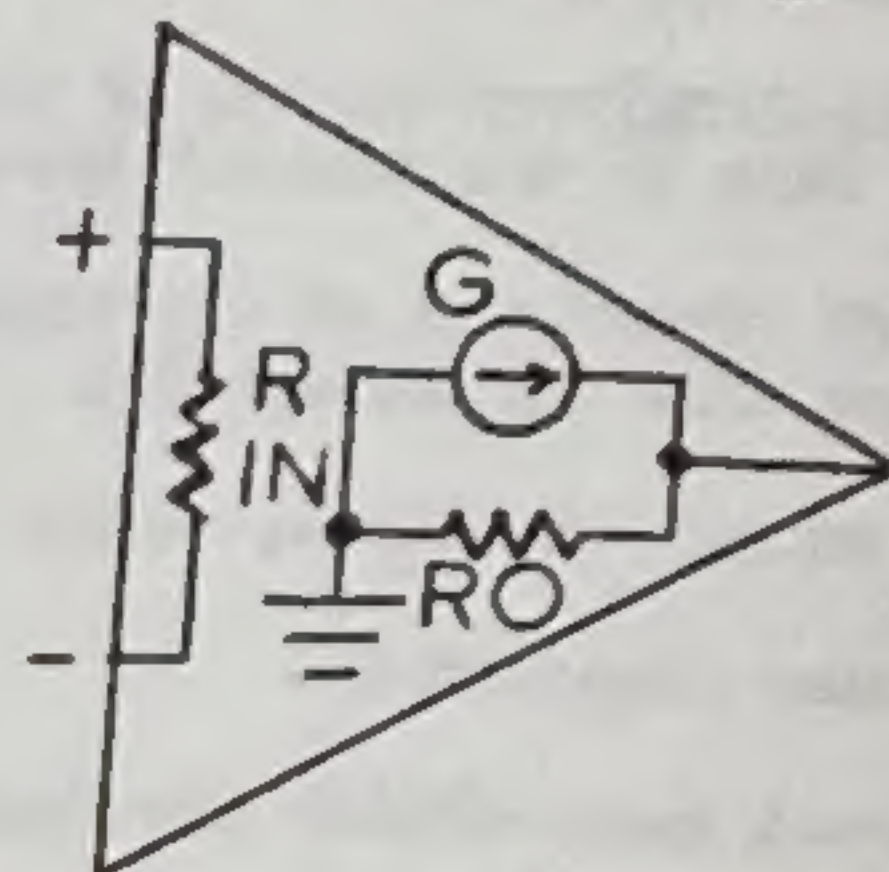
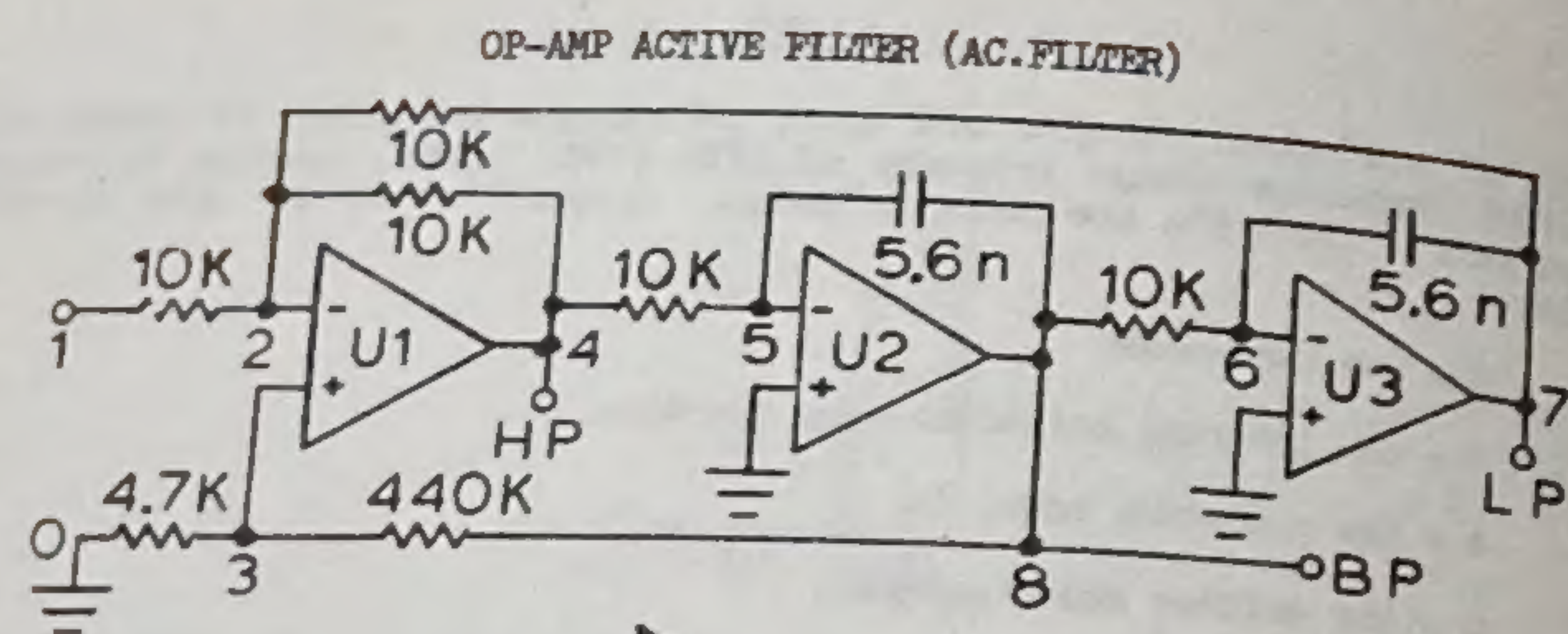
In conjunction with Apple Computer Inc.



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PART VALUE TOL% FROM TO C-PART

VG	1	0	0	1
RG	1	0	0	1
RS1	10E3	5	1	2
RFB1	10E3	5	4	2
RIN1	1E6	5	3	2
R+G1	4700	5	3	0
RO1	100	0	4	0
G1	1E3	30	0	4
RS2	10E3	5	4	5
CFB2	5.6E-9	5	8	5
RIN2	1E6	5	0	5
RO2	100	0	8	0
G2	1E3	30	0	8
RS3	10E3	5	8	6
CFB3	5.6E-9	5	7	6
RIN3	1E6	5	0	6
RO3	100	0	7	0
G3	1E3	30	0	7
R2-1	440E3	5	8	3
R3-1	10E3	5	7	2

#### NOTES

This is a three-amplifier, statevariable 3-kHz bandpass filter. The normal

output is node 8. Look at node 7 to see the low-pass response, or node 4 to see the high-pass response.



#### APPENDIX B - SETTING UP THE APPLE II SYSTEM

This appendix includes a list of the equipment you will need to use the Circuit Analysis Programs on your Apple II. You do not need to read all the manuals but they should be on hand to answer questions that may arise in operating the equipment (eg. how to boot the diskette).

In order to be able to provide Special Delivery Software at a lower cost the master program diskette has been copy protected and write protected. It is suggested that you put this diskette in a safe place in the event that you should need to use it following damage to the backup diskette.

The Circuit Analysis programs are written in Applesoft BASIC. To use them you will need the following equipment.

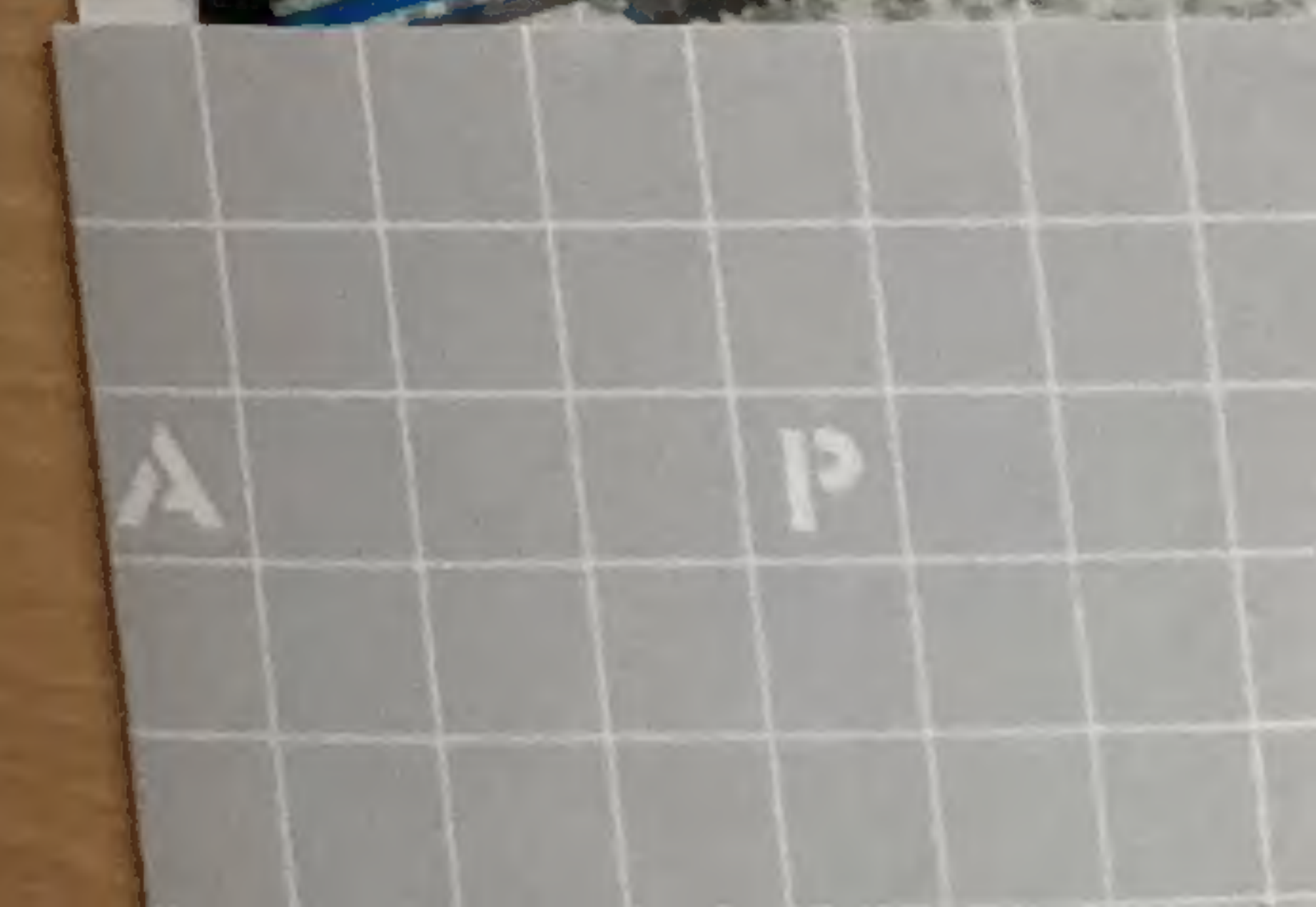
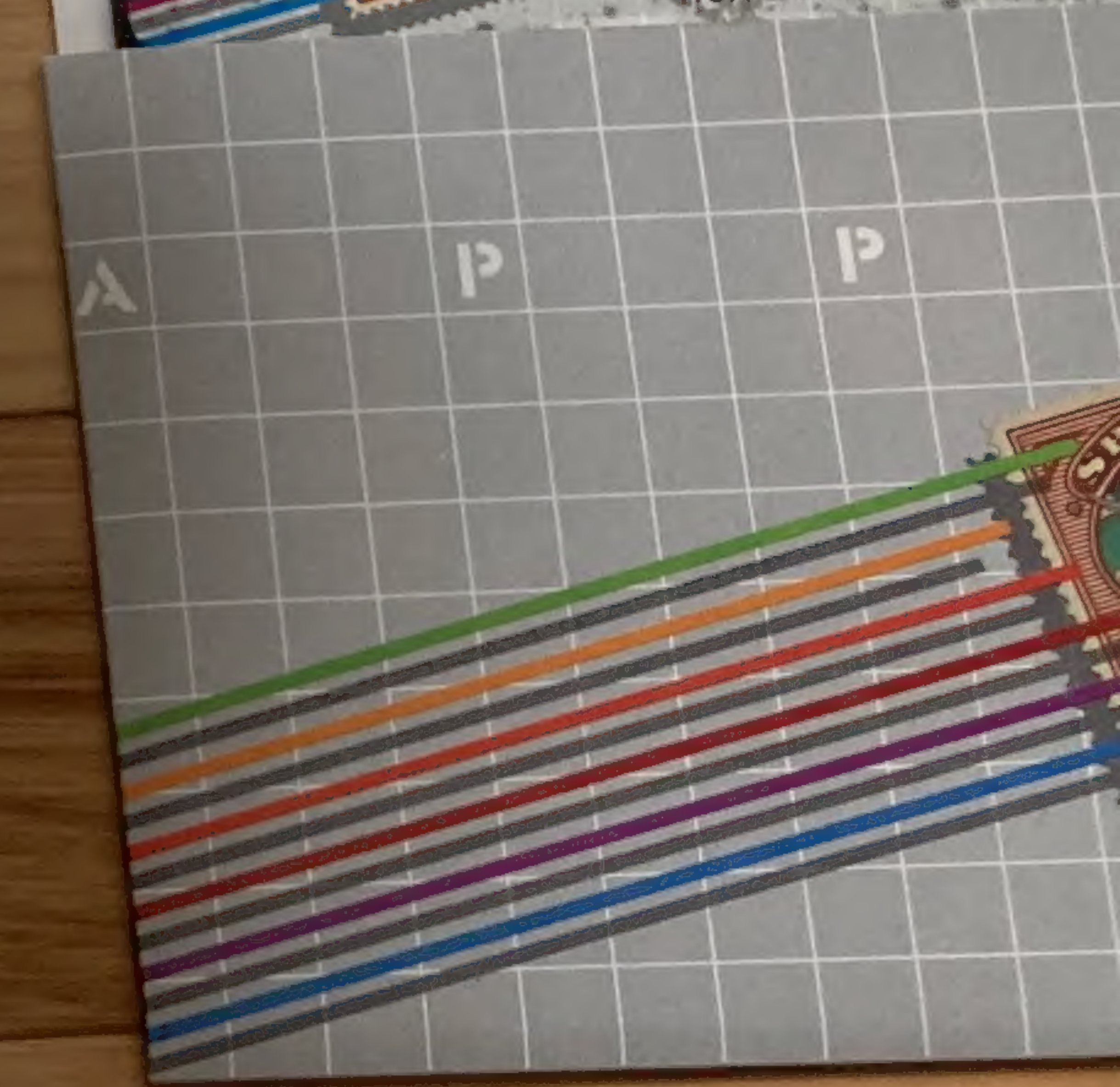
- an Apple II Plus with 48K bytes of RAM; or
- an Apple II with 48K bytes RAM and an Applesoft firmware card; or
- an Apple II with the Language System.

Plus:

- an Apple Disk II with Controller (16 sector PROMs);
- a video monitor or television.

For reference you should have on hand a copy of the following manuals:

- This Manual;
- Apple II BASIC Programming Manual (Setting up the Apple II);
- DOS Manual (How to boot the diskettes).



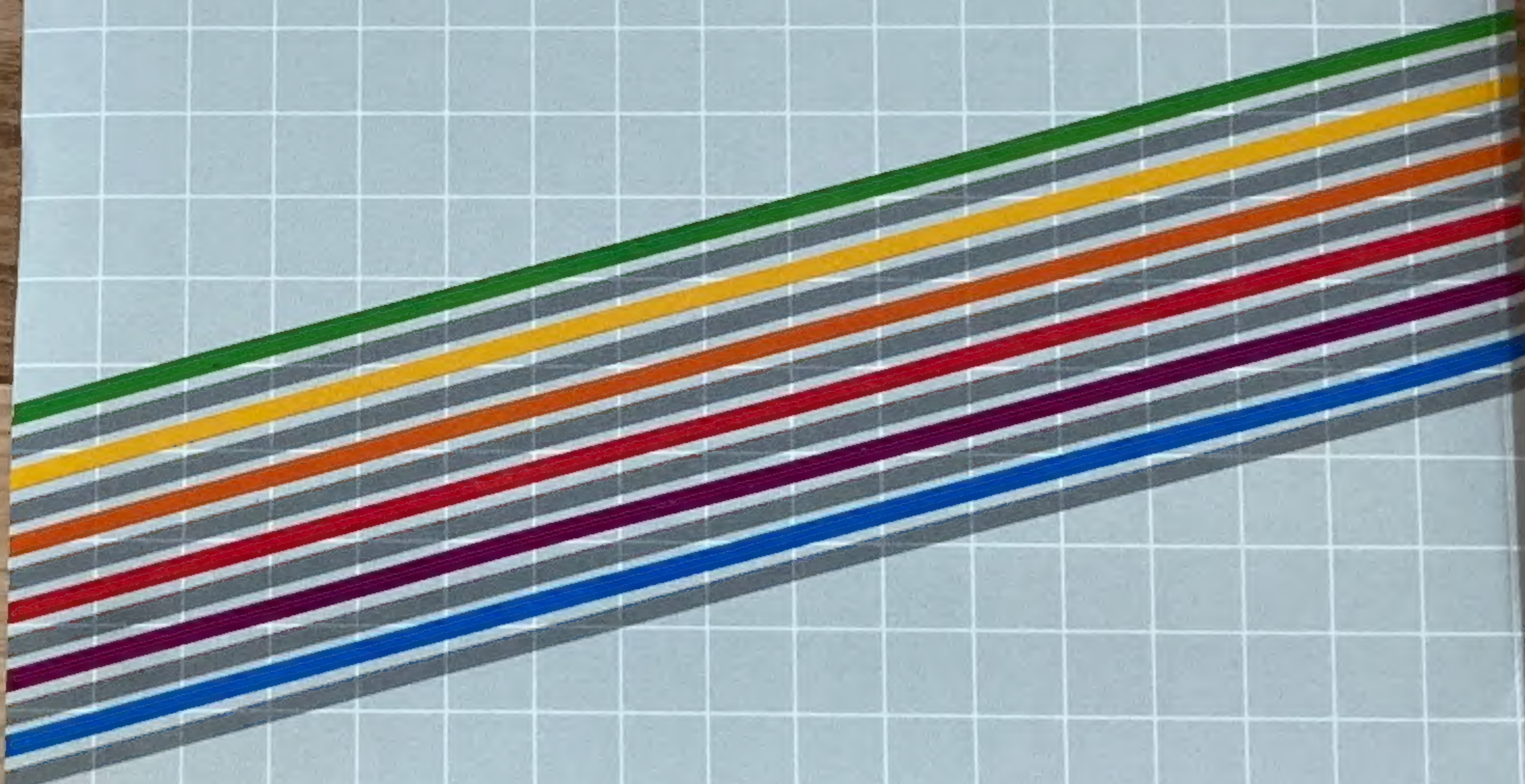




# CIRCUIT ANALYSIS

C2S0003 MASTER

652-2054-00



 **apple computer inc.**

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\*\*\*\*\*  
 \*\* APPLE/CIRCU  
 \*\* AC.TR AMP  
 \*\* JOHN DOE 2/1  
 \*\*\*\*\*

<< FILE - AC.TR

PART	VALUE	TOL%
VIN	1	
C1	1	UF 0
R1	1000	OHM 10
RE	100	OHM 5
R2	26	OHM 20
CCB	100000	OHM 10
RC	10	PF 5
R3	1000	MEG 30
B	120	OHM 5

<< NOMINAL OUTP

FREQUENCY IN HERTZ = 100  
 VOLTAGE GAIN = 18.  
 DECIBELS = 25.  
 PHASE SHIFT DEG = -14.

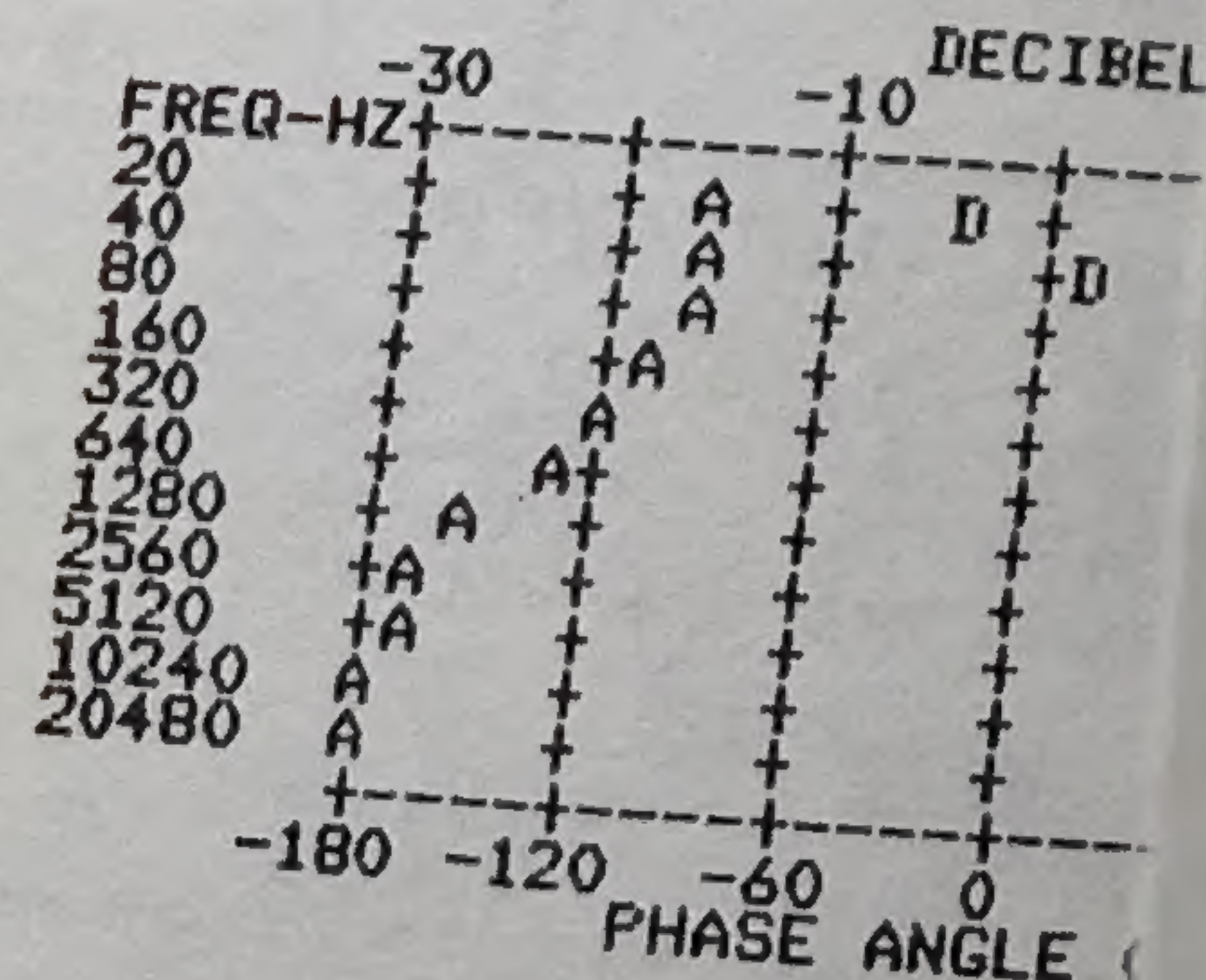
<< FREQUENCY RESI

LOW, HIGH, STEP FREQ. = 20

FREQ-HZ OUTPUT-VOLTS DECI

20	.671648071	-3
40	1.34136937	2.
80	2.6674888	8.
160	5.21798057	14
320	9.63357803	19
640	15.2729085	23
1280	19.370986	25
2560	21.0374482	26
5120	21.5254543	26
10240	21.6511876	26
20480	21.6762676	26

PLOT DATA (Y/N)? Y



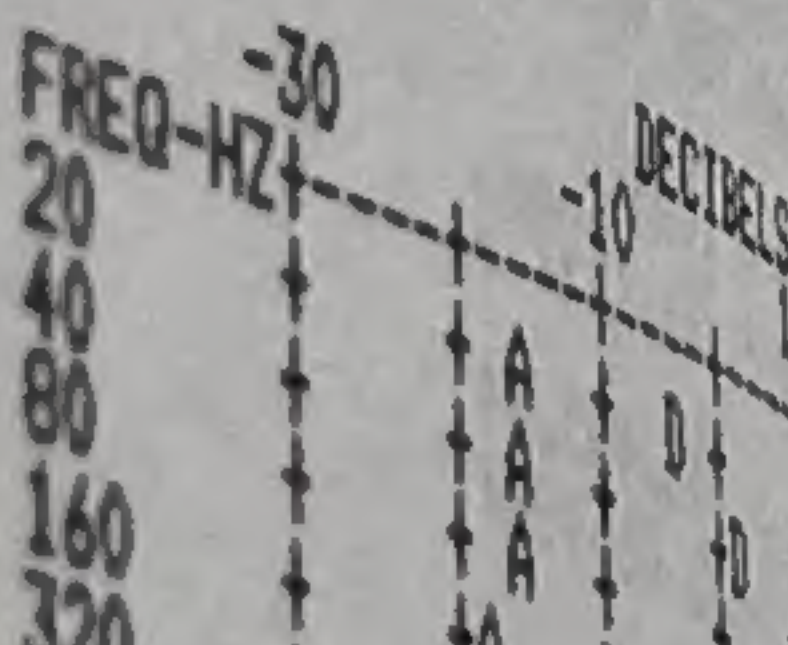
PART	VALUE	TOL%
VIN	1	
C1	1	UF 0
R1	1000	OHM 10
RE	100	OHM 5
R2	26	OHM 20
CCB	100000	OHM 10
RC	10	PF 5
R3	1000	MEG 30
B	120	OHM 5

FREQUENCY IN HERTZ	VOLTS	DECIBELS
20	.671648071	-3
40	1.34136937	2.
80	2.6674888	8.
160	5.21798057	14
320	9.63357803	19
640	15.2729085	23
1280	19.370986	25
2560	21.0374482	26
5120	21.5254543	26
10240	21.6511876	26
20480	21.6762676	26

LOW, HIGH, STEP FREQ. = 20

FREQ-HZ OUTPUT-VOLTS DECI

PLOT DATA (Y/N)? Y



<< PART EFFECTS & WORST CASE >>  
 FREQUENCY IN HERTZ = 1000

PART NAME	EFFECT ON OUTPUT Z	TOLERANCE EFFECT Z
VIN	100	0
C1	29.21	2.92
R1	-28.53	-1.43
RE	-1.32	-263662812
R2	-41.3	-4.13
CCB	32.35	1.62
RC	-.0928452364	-9.28452364E-03
R3	.0279439104	8.38317311E-03
B	67.95	3.4
	27.6	8.28

WORST CASE: OUTPUT DECIBELS PHASE-DEG

MINIMUM	14.1518717	23.02	-143.98
NOMINAL	18.2265718	25.21	-147.23
MAXIMUM	22.3661475	26.99	-149.08
TOTAL RANGE	= 45.07 %		
		3.97	5.11

<< TRIAL RUN & TEST LIMITS >>

FREQUENCY IN HERTZ = 1000  
 NUMBER OF TRIALS (10) = 10  
 NOMINAL = 18.2265718 25.21 DB  
 AVERAGE = 17.6292922 24.92 DB  
 STD DEV = .732832778

99 PERCENT FALL WITHIN:  
 MINIMUM = 15.7385837 23.94 DB  
 MAXIMUM = 19.5200008 25.81 DB

<< OPTIMIZE A PART >>

FREQUENCY IN HERTZ = 1000  
 PART TO BE OPTIMIZED = R3  
 PARAMETER TO BE OPTIMIZED:  
 (1=VOLTS, 2=DB, 3=DEGREES) = 2  
 DESIRED PARAMETER VALUE = 20

PART R3 = 1000  
 PARAM. VALUE = 25.2140998

PART R3 = 975.483234  
 PARAM. VALUE = 25.0664834

PART R3 = 142.405544  
 PARAM. VALUE = 10.9331799

PART R3 = 300.724402  
 PARAM. VALUE = 16.8938559

PART R3 = 422.814195  
 PARAM. VALUE = 19.4565468

PART R3 = 454.336918  
 PARAM. VALUE = 19.9805549

PART R3 = 455.563974  
 PARAM. VALUE = 20.0000833

ANOTHER TRY (Y/N)? N

RETURN PART TO ORIGINAL VALUE (Y/N)? Y

<< END OF AC.TR AMP >>